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ABSTRACT

The debate about possible tradeoffs between quantity and quality in schools has been confused by using available data as a basis for conceptual definitions. Under certain conditions expansion of enrollment or class sizes will have either no influence or a positive influence on the the quality of learning. The conventional wisdom about tradeoffs between quality and quantity in education is explored. Data from primary schools and about students in Pakistan rather than aggregated national statistics about schools and their quality is used here. Situations in which larger numbers of students may enhance the quality of education are suggested. The tendency to advocate policies for single countries on the basis of conclusions drawn from cross-national comparison is questioned. (KM)

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EVIDENCE FROM PAKISTAN

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DOES EXPANSION HELP OR HURT QUALITY IN PRIMARY SCHOOLS? EVIDENCE FROM PAKISTAN[1]

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Both the research literature and professional folklore suggest that countries with limited budgets face a tradeoff between quantity and quality in primary education (Lockheed and Verspoor, 1989; Mingat and Tan, 1985). Writing about Indonesia, Beeby (1985) states that "the most obvious conflict in the deciding of educational objectives appeared to be between the expansion of the schools and improving the quality of the work done in them."

Fuller (1986:494) offers this summary of the conflicts between expanding enrollment and educational quality:

> Suspicion has been expressed in development circles that school quality may be dropping in many countries due to continuing enrollment growth and declining education budgets. Despite sharp enrollment gains since 1970, for example, government spending for education as a percentage of GDP fell from 21 to 18 percent in the

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[1] Paper presented at the American Educational Research Association meeting in Boston, April 1990. The data used for this analysis were collected by project BRIDGES in Pakistan, a collaborative effort of the Harvard Institute for International Development and the Academy of Educational Planning and Management of the Ministry of Education. BRIDGES is a cooperative agreement between HIID and the Agency for International Development.

> poorest nations during the 1970s....The conflict between rising enrollments and declining educational resources may be leading to the erosion of school quality in the Third World.

In an essay on school quality Fuller (1985:18) states that the expansion of schooling with a leveling of resources for education "...may indicate a diminishing level of expenditures per student and a thinning quality of education."

One difficulty with the debates over quantity and quality is that they take place at two levels of analysis: the nation and the school. The following statement represents the views of those who focus on the national level:

> Looking across all nations, countries with higher primary school enrollment rates also have higher quality schools. However, after controlling for differences in national wealth, developing countries with higher enrollment rates actually have **lower** school quality in terms of expenditures per pupil. And over the 1970-1980 period, expenditures per pupil declined in those countries with the highest growth in enrollment rates (ibid.:16).

Here Fuller pitches the debate at the national level, apparently because that is where statistics are available on enrollment and per-pupil expenditures. But later Fuller offers a definition of quality that comes much closer to what happens in schools:

> (a) the level of material inputs allocated to schools

> per pupil (resource concentration), and (b) the level of efficiency with which a fixed amount of material inputs are organized and managed to raise pupil achievement (ibid.:23).

In explaining this definition the author speaks directly of the value added by the school to a child's achievement.

In short, the debate about possible tradeoffs between quantity and quality has been confused by using available data as the basis for conceptual definitions. While it is legitimate to assess quantity and quality with aggregated data at the country level, the concepts have far more meaning when they are applied at the school level. It is head teachers and teachers, not countries, that manage large or small schools and classes, and it is schools where students receive high or low quality education. Future debates on quantity and quality should add data about specific schools, classrooms, head teachers, teachers, and students to the gross figures now reported in the literature. While national data do have value for cross-country comparisons, within any single country data drawn from schools must be considered more valid indicators of quantity and quality than those at higher levels of aggregation. This study follows that suggestion by using data on quantity and quality from schools in Pakistan.

The paper's central argument is that under certain conditions expansion of enrollment or class sizes will have either no influence or a positive influence on the quality of

learning. The conditions are:

1. Most classes have pupil/teacher ratios under 40.
2. The style of teaching is traditional, with heavy emphasis on lecturing and rote memorization.
3. Even though the expansion in enrollment may mean lower per-pupil expenditures, it does not result in lower salaries or allowances for teachers and less facilities for teaching, such as textbooks, a blackboard and chalk.
4. Expansion is not accompanied by conditions leading to lower academic achievement, such as multi-grade instruction by the same teacher, or by consolidation of schools, which would result in lower access for students far from the larger catchment area.

When adding students is accompanied by lower teacher wages, deterioration in buildings and teaching facilities, or reduced teacher morale, there may well be lower quality instruction and less learning by students. But in some situations, such as those seen in Pakistan's primary schools, expansion may not only do no harm to but actually benefit student learning.

The paper's stance is unorthodox in four respects. First, it challenges the conventional wisdom about tradeoffs between quantity and quality in education. Second, it uses data from schools and their students, rather than aggregated national statistics about schools and their quality. Third, it will suggest situations in which larger numbers of students may

enhance the quality of education. And fourth, it questions the tendency, seen particularly in recent reports by the World Bank (e.g., Lockheed and Verspoor) to advocate policies for single countries on the basis of conclusions drawn from cross-national comparisons. We strongly endorse comparative analysis, but believe that policy applications must take account of the unique circumstances of individual nations or regions within them.

The data used come from a probability (random) sample of 478 government primary schools in the four provinces and federal area of Pakistan. One criterion of selection was that the schools have Grades 1 through 5, the required number of classes for a complete primary school. The study also included interviews with over 900 teachers, achievement tests to more than 11,000 Grade 4 and 5 students, the collection of information on the enrollment and expenditures in each school, and interviews with the supervisors of the sample schools. The data were collected in late 1988 and early 1989.

The schools covered in the Pakistan study, and found in many other poor countries, are mostly at the stage of what Beeby (1986) calls "formalism." They have a uniform syllabus, use a single textbook for each subject, stress memorization, and pay little explicit attention to the individual learning styles or emotional life of the students. Most teachers follow a standard curriculum, rely heavily on textbooks, have and use few instructional aids, and make little effort to tailor instruction to the individual talents of each pupil. Further, though they

cover a large range, average class sizes in Pakistan are not large. They run from means of 32 in Grade (Class) 1 to 16 in Grade 5 and medians of 22 in Grade 1 and 10 in Class 5. Data on expenditures for the schools covered further show that, while in absolute terms they remain low, in the past five years teacher salaries have increased somewhat in real terms. These conditions provide an excellent opportunity to test the relationships between the quantity of students and the quality of their learning.

The analysis measures quantity in two ways. The first is through information on the total number of total number of students enrolled in the school; class sizes for Grades 4 and 5, the grades on which there are achievement tests to assess quality; and the number of students who actually took the achievement test on the day it was given. The second approach to quantity was by developing rates of continuation from one grade to another. Four indicators will be used:

Continuation 1 to 5 (1984-1988): the number of students enrolled in Grade 5 in 1988 divided by the number enrolled in Grade 1 in 1984. The figure for all schools is 47%.

Continuation 1 to 5 (1988): the number of students enrolled in Grade 5 in 1988 divided by the number enrolled in Grade 1 in 1988. The figure for the total sample is 42%.

Continuation Grade 4 to 5 (1987-1988): the number of

students enrolled in grade 5 in 1988 divided by the number enrolled in Grade 4 in 1987. The rate for all schools is 76%.

Continuation Grade 3 to 4 (1987-1988). The number of students enrolled in Grade 4 in 1988 divided by the number enrolled in Grade 3 in 1987. The figure for all sample schools is 81%.

The measures of quality are achievement tests in mathematics and science given to over 11,000 Grade 4 and 5 students in all schools; and continuation rates derived from enrollment data kept in the school or the district educational office. The tests, which were developed by the federal Ministry of Education in collaboration with the World Bank, are based on the mathematics and science curricula used in the schools. The analysis relates measures of quantity to the mean scores of the tests for Grades 4 and 5 in the sample schools.

As long as the four conditions stated above are met, adding students to classes marked by formalism in instruction and the class sizes reported will have either no impact or a positive impact on the quality of learning. Given the style of instruction, which emphasizes lecturing and rote learning, teachers handling a class of 20, 30, or even 40 might absorb another 10 students with no great difficulty. The new students would mean more homework assignments to read and more examinations to grade, but they still might be absorbed without great difficulty. In some circumstances, to be mentioned later,

the increase in size may also provide benefits for teaching and learning in the classroom and the entire school.

When the average class size is over 50 or when teachers pay attention to problem-solving, creativity, and the individual differences of students, expansion could damage the quality of instruction. To borrow again from Beeby (1986:38), the harm done by larger classes increases as schools move from formalistic education to instruction emphasizing meaning and understanding as well as variety in content and methods. Hence the effect of increasing size depends on the precise situation in which a country's primary education system finds itself. For many schools in Pakistan the present situation would permit expansion with no harm and often some benefit to quality.

FINDINGS

This section summarizes the main findings from the analysis of the survey data. Following this summary will be an interpretation of the results and a discussion of their implications for educational policy.

Student achievement and enrollment

The survey provides three indicators of school and class size that can be related to the measures of quality: the number of students enrolled in the school; the number enrolled in each class, such as Grade 4 or Grade 5; and the number of students in each class who took the achievement tests. The last two indicators overlap, but are not identical. When class sizes were more than 25, field interviewers were given a procedure to limit

the number taking the test to 25.

If larger school or class sizes hurt student achievement, there should be a negative relationship between all three indicators and test scores in mathematics and science. In fact, the relationships in every case were positive for the total sample of schools (see Table 1).

The number of students enrolled in the school was positively and significantly correlated with achievement test scores in mathematics and science for Grades 4 and 5. The correlations ranged between .22 and .26. Given critical differences between urban and rural schools in Pakistan, it is necessary to consider the relationships for those locations as well as the total sample. The same pattern held for rural schools, which make up about 80% of the primary schools in Pakistan, and for urban schools. The main difference was that the correlation between enrollment and mathematics in Grade 4 rose to .38 in urban areas while it dropped to .12 for rural schools.

Similar findings appear in the relationships between the total number of students enrolled in a class and achievement scores. For the total sample the four correlations were between .16 and .22, all statistically significant. In rural schools all the relationships were significant at the .05 level except for class enrollment and achievement for science in Grade 4. In urban schools the exception was science in Grade 5.

The findings also show positive associations between the number of students taking the achievement test in each grade and

scores on that test. The correlations are highest for the science tests in Grades 4 and 5 (.24 and .27), and lower but still significant for the mathematics tests (.18). In urban areas the relationship is positive for all 4 tests but significant only for the two in mathematics. In rural areas the correlations are significant for all 4 tests and, as in the total sample, higher for science than for mathematics.

Student achievement and continuation rates

Continuation rates provide indirect measures of quantity in schools. In theory, if a country wished to reduce the total size of a school and class sizes in the upper grades, one method would be to restrict the number of promotions made in each grade. The direct result would be larger class sizes in the lower and smaller sizes in the higher grades. A likely indirect effect would be higher dropout rates for students who are not promoted, especially for those held back more than once.

The conventional view of the relationship between the quantity of students and the quality of learning would again suggest a negative relationship between continuation rates and student achievement. With initial intake held constant or growing, the higher the continuation rates, the larger the total enrollment, and the lower the quality of instruction. Once more the survey data, with two exceptions, show the opposite finding for the total sample and for rural schools (see Table 2).

When the four measures of continuation are related to the achievement scores in mathematics and science for Grades 4 and 5,

the correlations in the overall sample are positive and significant in 14 of the 16 possibilities. The significant correlations run between .24 and .09, and are higher for the mathematics than for the science tests. The exceptions are the correlations between continuation from grades 3 to 4 and scores in the two science tests. Virtually the same findings appear for rural schools. For urban schools the correlations are positive and significant for only 2 of the 8 possibilities in mathematics and significant for none of the associations with science scores.

For certain purposes, such as judging the success of a school in providing 5 years of primary education, continuation rates can also be considered a measure of quality. The findings presented show that it is significantly related to the main measure of quality, achievement in Grades 4 and 5.

INTERPRETATION

The findings challenge the widely-held notion that larger school and class sizes lead to lower quality education. The data show that larger enrollments in school, larger class sizes, and larger numbers of students taking achievement tests have either a positive relationship or no significant association with the principal measure of quality: student achievement in mathematics and science. Three reasons may explain the positive associations between quantity and quality:

1. Larger schools create mediating conditions leading to higher levels of quality. School size, for example, is related to

having a school head who does not teach full-time. That, in turn, is related to student achievement

2. By promoting greater continuation rates, higher achievement scores lead to larger school size. Quantity thus creates conditions favoring quality, while quality, measured by achievement tests, indirectly raises quantity.

3. In schools with low ratios of pupils to teachers, additional students may provide a critical mass beneficial to instruction. In Pakistan these ratios run from two pupils to five teachers to 204 pupils for one teacher. Overall about 35% of the schools have class sizes under 30 and 14% 20 or under. Particularly in schools with class sizes under 20, additional students may stimulate the teacher toward better preparation and more effective classroom practices. The survey data permit no test of this hypothesis.

How quantity improves quality

Under the limiting conditions specified earlier, the size of a school affects quality by creating mediating conditions that promote better leadership and greater organizational flexibility within a school. A single-teacher school has no school head to provide leadership or handle administrative duties nor does it have many options for organizing instruction. When schools are larger there is likely to be a school head, more teachers, and a larger number of classrooms. These concomitants of size are the mediating conditions that favor quality. The data show that school size is related to the number of teachers and the number

of classrooms, and that all three are positively related to achievement scores in mathematics and science.

As school size increases, the time spent by the school head on teaching decreases. The findings show that the lower the proportion of time the school head spends on teaching, the higher the achievement test scores on students in that school. The most likely explanation is that in these circumstances school heads have more chance to supervise teachers, insist on standards of quality, and coordinate activities among teachers and other school staff. While most school heads seem to spend most of their non-teaching time on administrative duties, those in larger schools have more scope for leadership if they are inclined to lead.

One surprising finding is that school quality, measured by achievement scores, is higher when school heads are male rather than female. The survey and related interviews with about 100 educational administrators in Pakistan provide no insights into this apparent effect of gender.

A counter to our interpretation of the effects of size is that quantity is only a surrogate measure for urban-rural differences. It is true that school size and headmasters with part-time or no teaching responsibilities are more likely to be found in urban than rural areas. But one cannot adopt the urban-rural distinction as an alternative explanation without asking what it means when applied to schools. The fact that some conditions related to quantity are found only or mostly in urban

areas is a good reason for not using urban-rural as a control. If most of the schools with no headmaster or headmistress are in rural areas and most of those with school heads without classroom responsibilities are in urban areas, separating schools by their location would destroy the very scale that is being tested. For this particular analysis using an urban-rural control would be inappropriate. Nonetheless another study in Pakistan may wish to seek enough large schools in both rural and urban areas to permit a careful assessment of the impact of size in those locations. In the present study most of the schools where headmasters or headmistresses had low teaching loads were in urban areas.

How quality affects quantity

The main effect of higher quality education, as indicated by achievement tests, is to increase continuation rates. With better classroom instruction teachers can promote more of their students to the next grade and thereby raise levels of continuation. With more students promoted and fewer students dropping out because of discouragement with their progress, schools become larger. At least within the range of school sizes seen in Pakistan, increases in size create the mediating conditions already mentioned that result in better teaching.

In sum, quantity and quality must be treated as interrelated rather than as competing elements in education. In the leading studies on quantity-quality tradeoffs there is little attention paid to the possibility that these features of schools may complement rather than compete with each other. Quantity can lead

to better quality, while quality can contribute to higher quantity.

POLICY IMPLICATIONS

Following our earlier advice about the need for country-specific analysis of educational policy, we will confine our recommendations about schooling to primary education in Pakistan. Other comments will deal with future research in this field.

First, the evidence suggests that with current class sizes and classroom practices in Pakistan, expansion of school and class sizes may have no effect on or actually improve quality. Because the data on which our findings are based is cross-sectional rather than longitudinal, evidence about the effects of expansion is indirect. The data allow us to say that larger schools and class sizes have certain relationships with quality, they do not permit us to make solidly anchored observations about expansion per se. Nevertheless, they suggest the wisdom of tracking the relationship between school expansion and educational quality in a longitudinal study of primary schools. Aside from the relationship between quantity and quality, two issues worth exploring in such a study are: (a) at what point do school and class sizes begin to have negative effects? and (b) exactly what happens within a school when it grows larger? For example, are the earlier interpretations about leadership and organizational flexibility borne out by observation of expanding schools.

Second, to improve the conditions for student learning,

expanding schools should avoid conditions known to reduce achievement. Among these are low levels of formal education among teachers, multi-grade instruction by the same teacher, and using student monitors for many hours with classes not being taught. It would also be counterproductive to expand school size by consolidating rural schools. Other analysis in Pakistan shows that, since most students walk to school and parents are wary of having their daughters travel more than one kilometer each way, access will drop if an expanded catchment area means more time, on the average, for each student to reach school. Expansion, in other words, must pay careful attention to a number of conditions already known to be related to student achievement. The ideal experiment would be one in which a longitudinal study to observe the effects of enrollment increases in existing schools. The results of such research could provide help in the design of new schools.

Third, future research on the relationship between quantity and quality in schools should have two features. It should, above all, observe the interactions of those conditions in single schools. Collecting information on expenditures per student in those schools would permit assessment of the effects of quantity on per-pupil costs and the impact of those costs on school quality. In addition, research on the expansion of schools should be longitudinal. Studying the same schools at two or more points in time would permit answers to questions about expansion that cannot be provided by a cross-sectional study.

Finally, scholars interested in the relationships between quantity and quality should use both national- and school-level data in their analyses. Although school-level studies have greater validity, because schools are the sites where teaching and learning take place, comparisons of findings from both kinds of data would clarify the validity of each and show where one might help to make sense of the other. The current practice of using national proxy measures as the only indicators for what is happening in schools should not be continued.

REFERENCES

Beeby, C. E., 1986. "The Stages of Growth in Educational Systems." IOn S. P. Heyneman and D. S. White, The Quality of Education and Economic Development. Washington, D. C., The World Bank, 37-44.

Fuller, B., 1986. Is Primary School Quality Eroding in the Third World? Comparative Education Review, 30:4, 491-507.

Fuller, B., 1985. Raising School Quality in Developing Countries: What Investments Boost Learning? World Bank: Education and Training Department, Report No. EDT7.

Lockheed, M. E. and A. Verspoor, with others, 1989. Improving Primary Education in Developing Countries: A Review of Policy Options. Washington, D. C.: Population and Human Resources Department, The World bank.

Mingat, A. and J. P. Tan, 1985. Improving the Quantity-Quality Mix in Education: A simulation of Policy Tradeoffs. Washington, D.C.: World Bank, Education and Training

Department, Paper No. 15.

Table 1. Relationship between Number of Students and Achievement.

		Math 4	Math 5	Science 4	Science 5
Number of Students	R	0.24	0.23	0.21	0.25
enrolled in school	n	(384)	(371)	(384)	(371)
(except Kachi)	p	0.06	0.05	0.04	0.06
Number of Students	R	0.22	0.20	0.18	0.16
in Class (4 or 5)	n	(434)	(423)	(433)	(422)
in 1988	p	0.000	0.000	0.000	0.001
Number of Students	R	0.18	0.24	0.18	0.27
Tested (in each)	n	(455)	(443)	(454)	(442)
grade-subject	p	0.000	0.000	0.000	0.000

R: Pearson Correlation Coefficient

n: Number of Students

p: Significance Level.

Table 2. Relationship between Achievement and Continuation Rates.

		Math 4	Math 5	Science 4	Science 5
Continuation from	R	0.24	0.22	0.13	0.14
Grade 1 to 5	n	(329)	(326)	(328)	(325)
(1984-88)	p	0.000	0.000	0.009	0.006
Continuation from	R	0.21	0.24	0.12	0.09
Grade 1 to 5	n	(394)	(384)	(393)	(383)
(1988)	p	0.000	0.000	0.008	0.035
Continuation from	R	0.16	0.15	0.06	0.04
Grade 3 to 4	n	(291)	(283)	(290)	(282)
(1987-88)	p	0.003	0.005	0.157	0.252
Continuation from	R	0.16	0.17	0.17	0.10
Grade 4 to 5	n	(315)	(312)	(314)	(311)
(1987-88)	p	0.002	0.002	0.001	0.045

R: Pearson Correlation Coefficient

n: Number of Students

p: Significance Level.